SOME REMARKS ON CASES INVOLVING OPERATIVE LOSS OF CONTINUITY OF THE COMMON BILE DUCT.

WITH THE REPORT OF A CASE OF ANASTOMOSIS BETWEEN THE HEPATIC DUCT AND THE DUODENUM.

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IN 1100 operations upon the gall-bladder and bile passages which have occurred in the hands of Dr. Charles H. Mayo and myself up to March 27, 1905, 159 were upon the common duct of the liver, and of these latter seven have involved complete loss of the continuity of the common bile duct as a direct result of the operation, five were intentionally produced in the attempt to remove a malignant neoplasm, one was accidentally caused, and one followed an extensive operation for gall-stone disease. The latter forming the case reported in detail.

The possibility of union between the divided ends of the common duct was first brought to our attention in an unfortunate manner. During the removal of a deeply situated and densely adherent gall-bladder, the common duct was accidentally divided. The ends were widely separated before the accident was discovered, rendering detection of the distal end a matter of some difficulty. The proximal fragment was easily identified by the escape of bile. The common duct was of normal size, which rendered suturing difficult and uncertain. It was accomplished in the following manner: three catgut sutures were placed in the remnants of peritoneum, adhesions, and right margin of the gastrohepatic ligament, drawing the duct ends into apposition; five fine catgut sutures were then introduced through all the coats of the common duct throughout three-fourths of its circumference, leaving a gap anteriorly for drainage. We simply reproduced as nearly as we could the condition which exists after choledochotomy for stone. The external bile discharge ceased in sixteen days, patient discharged on the twenty-second day, and has had no further trouble, now nearly two years.

This instance taught that fine catgut would hold a sufficient time for union to take place, and was not open to the objection to silk in the latter's liability to secondary stone formation, such as occurred in the reported case of Homan's. It also demonstrated that no harm followed taking all the duct coats firmly in a single suture.

Within a year we had an opportunity to apply the same technique to a case of carcinoma of the gall-bladder which extended down the cystic duct to the common duct, and in which the gall-bladder, cystic duct, and three-fourths inch of the common duct were excised. In this case the second portion of the duodenum was loosened from its bed after the manner of Kocher in his gastroduodenostomy, the intestine was drawn to the right and held by catgut sutures to the neighboring tissues. The patient made a good recovery and remained well until a return of the growth thirteen months later (*Medical Record*, April 30, 1904).

The condition of the third case was due to a small, very hard, malignant growth in the common duct causing obstructive jaundice. The tumor and nearly an inch of the common duct was excised and the ends sutured as in Cases I and II. The patient, however, died from capillary hæmorrhage on the third day, without fully recovering from the initial shock.

Our first attempt at direct union of the common bile duct to the duodenum came about through an effort to remove, what we supposed at the time to be, a stone impacted in the common duct, just in the margin of the pancreas and underneath the edge of the duodenum. The duodenum was loosened on its right side, turned upward and to the left. The duct was incised and the supposed stone found to be a typical duct carcinoma, hard, grayish white, and well defined. It was excised and the space closed by catgut sutures. The common duct was reinserted at a new location in the duodenum, at a point where it was covered by peritoneum, after the plan so successfully used by Halsted; catgut was again used as a suture material. A wick drain was inserted down to the suture line. This was a mistake. There was no leakage until the drain was removed, which did not take place until the end of a week. The plastic lymph, which should have protected the suture line, became entangled in the meshes of the gauze, causing difficulty and delay in removal, and so disturbed the union as to allow a minute fistula to form. This gradually increased in size from the biliary and duodenal discharge until the patient was exhausted and died at the end of the eighth week. The lesson taught was that a gauze drain should never be placed directly against an anastomotic suture line. The feasibility of union between the duct and the duodenum at a peritoneal covered situation was manifest by the temporary recovery of the patient.

The fifth case was reported in conjunction with a paper on cholecystectomy at the meeting of the American Medical Association, Surgical Section, 1900 (*The Journal*, December, 1900). In this patient we excised the cancerous gall-bladder with a tongue-like overlying portion of the liver, together with the whole of the cystic duct and part of the common and hepatic ducts. An unsuccessful effort at union of the deep duct was made. The operation was very easy from the fact that the liver was exceedingly movable and the ducts elongated. All the bile escaped from the external wound, to the great distress of the patient, until death occurred nine weeks later.

The sixth case, which concerned the successful removal of a carcinoma of the papilla and diverticulum of Vater, was reported in the *St. Paul Medical Journal*, June, 1901, but has no bearing on the subject under discussion.

The writer has most briefly reviewed some features of these cases to illustrate a few facts which experience teaches and which may be summarized as follows: first, the common duct may be united end to end, by through-and-through catgut sutures. It is essential that a few supporting sutures should be placed in the surrounding tissues, and that a portion of the circumference of the line of union be left open for relief of tension and drainage. Second, the common, and in certain cases the hepatic, duct may be implanted into the duodenum, provided a peritoneal covered portion of the intestine be chosen for the purpose. Third, to facilitate these operations, the second portion of the duodenum should be loosened and drawn to the right and held by fixation sutures, preventing tension on the duct suture line. Fourth, drainage, if necessary, should be pliable, covered with rubber tissue, and placed as distant to the suture line as will serve the purpose of protection against leakage.

In the following case the successful outcome was due to the care with which we were able to carry out these details.

CASE VII.—*Cholecystectomy and Choledochotomy followed by Extensive Stricture of Common Duct which was relieved by Secondary Anastomosis between the Hepatic Duct and Duodenum.*—Mrs. L. I., aged twenty-two years; mother of two children; admitted to St. Mary's Hospital, June 30, 1903, with the following history. For four years has suffered with "stomach cramps" and pain in right hypochondrium which passed through to the right shoulder. In one of these attacks she had been slightly jaundiced. Ten days ago an attack similar to the previous ones came on, but did not stop as before. The intense pain subsided, but was replaced by frequent colicky pains, nausea, chills, and fever. Stools were clay colored. Family and personal history other than above, negative. Examination, a slightly built woman five feet two inches in height; weight, ninety-eight pounds; heart and lungs, normal; urine contained bile, a trace of albumen, and a few hyaline casts. A moderate leucocytosis was present; temperature, 101° F.; pulse, 110; icterus fairly well marked; deep pressure over gall-bladder region during inspiration developed resistance and an indefinite sense of tumefaction. No other relevant physical findings. Diagnosis, gall-stones in gall-bladder and common duct. Operation, July 1, 1903. Through a four-inch straight incision in upper right rectus muscle a contracted, thick walled gall-bladder filled with stones was exposed. The superior angle of the incision was carried upward and inward along the costal margin, after the method of Bevan, and the common duct palpated and inspected.

It was full of stones and débris and closely adherent to the duodenum and surrounding structures. The gall-bladder was removed from below upward without opening its cavity. The cystic duct was slit downward into the common duct, which was freely opened. The common duct was dilated to the size of a lead-pencil and filled with putty-like material and stones, all of which was removed with a scoop. During the process, dark, flocculent bile appeared. The cleaning process was difficult, and when completed the duct was seen to be greatly thickened and the mucous membrane eroded. A few interrupted catgut sutures were introduced in the incised duct up to the entrance of the cystic duct. At this point an opening was left into which a fish-tailed rubber tube one-quarter of an inch in diameter was introduced and held by two fine catgut sutures. Around this a moderate amount of gauze was placed and protected by gutta-percha tissue, the whole being allowed to protrude from the upper angle of the abdominal incision. The operation lasted three-quarters of an hour. Patient reacted well, but was in a rather critical condition for several days, until normal bile in quantity made its appearance. Drains all out on the eleventh day; patient discharged on the twentieth day with a healed wound, bile freely present in the stool.

Readmitted May 25, 1904. Patient stated that for about five months she had been quite well, doing her housework, and had gained ten pounds in weight. About this time noticed some general skin pruritus, slight jaundice, and an unpleasant sensation in the stomach. This rapidly increased, and was followed by chills and fever, clay-colored stools, and severe illness. She was in bed for five weeks; eventually, the old drainage tract in the former incision opened up and discharged bile freely, with marked improvement. From that time until admission, the fistula discharged at intervals with temporary betterment. The periods during which the fistula remained closed were marked by severe symptoms, jaundice, nausea, chills, and fever. At the time of readmission fistula was not open. Patient emaciated, weight eighty-one pounds, jaundice extreme, chills, fever, and sweating, with colicky pains of daily occurrence. Pulse-rate, 120; temperature variable from subnormal to 103° F.; general debility marked.

May 26, 1904, under ether anæsthesia, and with the patient

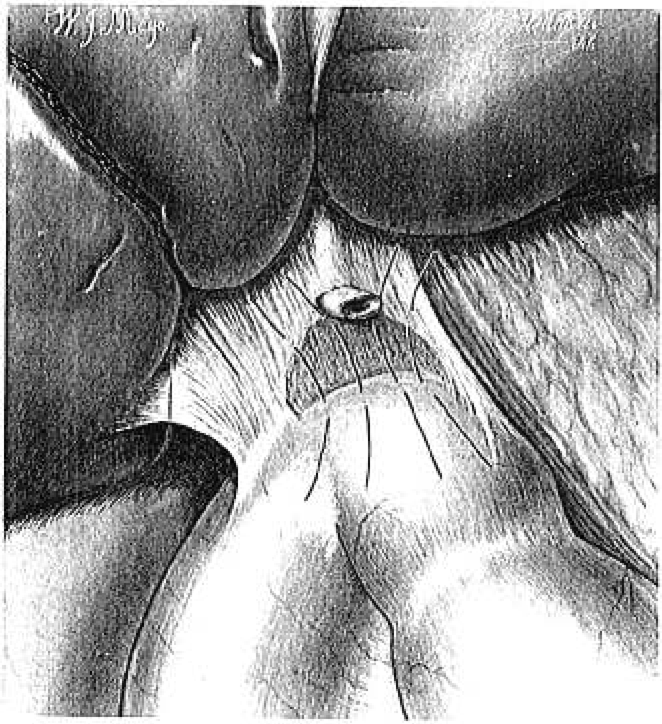

FIG. 1.—Liver raised upward. End of hepatic duct freed and sutures placed ready to draw duodenum into position. Note that gall-bladder was removed at previous operation.

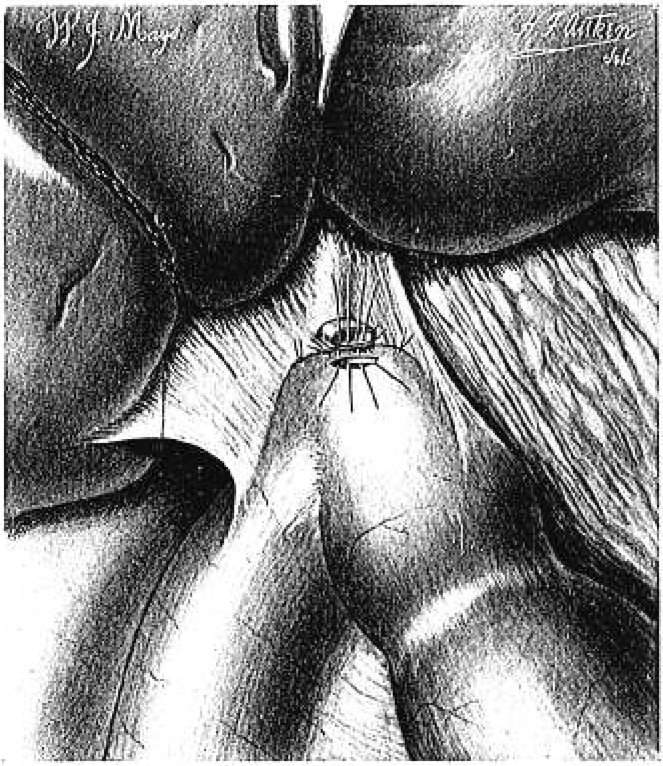

FIG. 2.—Fixation sutures tied, duodenum incised, and posterior row of through-and-through sutures in place.

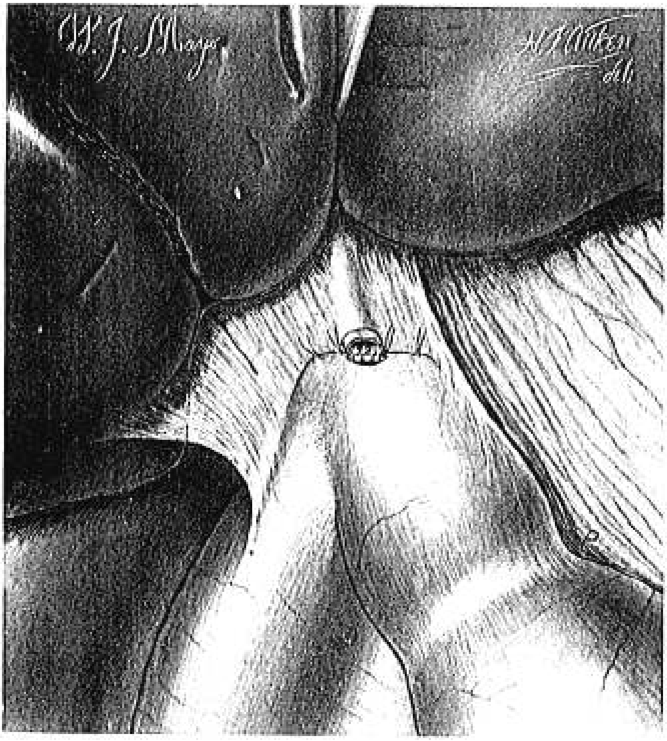

FIG. 3.—All posterior sutures in place and tied, ready for lateral and anterior sutures.

in Robson position, a five-inch incision was made just internal to and parallel with the cicatrix of the former wound. A dense tangle of adhesions was encountered, involving transverse colon, duodenum, and stomach on the one side, and the liver and ducts on the other. By following the remains of the fistulous tract carefully and keeping close to the liver, the original drainage opening at the site of the cystic duct was discovered. The hepatic duct was dilated and easily admitted the tip of the index-finger to the primary division. The common duct was reduced by cicatricial contraction to a fibrous cord, along which could be traced a little stain of bile. During the separation of adhesions, it was noted that the duodenum overlapped the remains of the common duct and formed one wall of the fistulous tract in its deeper portion. The external incision was continued to the sternal notch and the overlying liver held upward. The duodenum was still further mobilized. The hepatic duct was freed from its attachment to the fistulous tract and from the remains of the common duct, the adhesions posteriorly were not otherwise disturbed, and served a very useful purpose. About three inches from the pylorus the duodenum was caught with three catgut sutures and fastened firmly to the adhesions and scar tissue about the hepatic duct, so that it was brought into contact with the end of the hepatic duct (Fig. 1). At the point of easy contact an elliptical piece of all the coats of the duodenum was excised of about the same diameter as the open end of the hepatic duct (Fig. 2), and four or five catgut sutures were introduced from the mucous side through all the coats of both duct and intestinal wall. In this way the posterior line of the anastomosis was completed. By alternately placing a suture externally and internally, the sides were built up in a similar manner to a two-row intestinal anastomosis, excepting that only the inner row penetrated the duct wall. At the upper part, the few remaining sutures were all placed before they were tied (Fig. 3). The duodenum was still further attached laterally and anteriorly to the scar tissue, covering the liver and ducts by catgut sutures, making a broad area of attachment. A drain of rolled gutta-percha tissue was placed at the upper angle of the abdominal incision and another at the lower, but each at a considerable distance from the anastomotic suture line. The abdominal incision was then closed. Time of operation, fifty minutes. Patient made an uninterrupted recovery. There was no leakage of any kind, drains were removed on the sixth day, patient discharged on the sixteenth day. Patient re-examined ten months after the operation (March 22, 1905), had gained thirty-one pounds in weight, and was in excellent health. I would here remark that the original removal of the gall-bladder was unfortunate, as a cholecystenterostomy would have been far easier as a second operation, provided, of course, that drainage would have restored its function to a sufficient extent. Since that time we have been more conservative about the removal of the gall-bladder in connection with common duct surgery.